

Drug Addiction in Pregnancy: Disease Not Moral Failure

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Disclosure

The author has no relevant financial interest or affiliations with any commercial interests related to the subjects discussed within this article. No commercial support or sponsorship was provided for this educational activity.

ABSTRACT

Nurses have demonstrated concern for years about their interactions with pregnant women who abuse drugs. Reports of nurses' concern with substance abuse have been reported in the literature since the 1980s. As with any chronic disease, drug addiction causes physiologic changes, and the pathology that occurs in the brain drives characteristic behaviors. Research suggests that choices that addicts make are driven by pathology rather than by failure of a moral compass. This article reviews the theoretical explanations for addictive behaviors, describes the pathophysiology of drug addiction that is responsible for the predictable symptoms and behaviors exhibited by women who abuse prescription drugs and other opioids, and identifies nursing interventions to impact positive outcomes. Nurses who have a working knowledge of this disease will provide more effective nursing care to the women they encounter and are better prepared to make a difference in the lives of both women and their children.

Keywords: substance abuse; addiction; drug-seeking

PERINATAL AND NEONATAL NURSES HAVE demonstrated concern for years about their interactions with pregnant women who abuse drugs. Reports of nurses' concern with substance abuse other than alcohol began to appear in the 1980s,^{1,2} increased in the 1990s,³⁻⁷ and continue into the present.⁸⁻¹² Maguire and colleagues recently reported anger toward mothers among nurses who cared for infants with neonatal abstinence syndrome (NAS).¹⁰ Many of the nurses who participated in their study were not aware of the scientific evidence that guides treatment of narcotic abuse during pregnancy and tended to regard addiction as a moral or character failure. Similarly, Selleck and Redding undertook their survey of perinatal nurses' knowledge and attitudes as a result of interviews they had with new mothers who were in treatment for substance abuse.⁶ The mothers repeatedly told them that nurses treated them differently when they learned they tested positively for drugs, and nurse's attitudes became very negative. The 392 perinatal nurses who participated in the survey demonstrated limited knowledge

about perinatal substance abuse and had more punitive and negative attitudes than positive attitudes toward women who abused drugs.⁶ In a qualitative study of NICU nurses' experiences in caring for infants with NAS, Murphy-Oikonen and colleagues reported that nurses were frustrated and getting "burned out" because they seemed to underrate the specialized skills required to care for those infants, which conflicted with their technical expertise.¹¹ These authors also recommended education about perinatal substance abuse, reporting that the participants lacked a "depth of understanding of the power of addiction."¹¹

As with any chronic disease, drug addiction causes physiologic changes, and the pathology that occurs in the brain drives characteristic behaviors. Research suggests that choices that addicts make are driven by pathology rather than by failure of a moral compass. The purpose of this article is to describe the pathophysiology of drug addiction that is responsible for the predictable symptoms and behaviors exhibited by pregnant women who abuse prescription narcotics

and other opioids and identify nursing interventions to impact positive outcomes. Nurses who have a working knowledge of this disease will provide more effective nursing care to the women they encounter and are better prepared to make a difference in the lives of both women and their children.

THEORETICAL EXPLANATIONS FOR DRUG-SEEKING BEHAVIOR

Addiction is defined by the World Health Organization as “the harmful or hazardous use of psychoactive substances . . . [that] lead to dependence syndrome—a cluster of behavioural, cognitive, and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state.”¹³ Because opioids are so seductive, several theories have been proposed to explain why some people become addicted. Perhaps the oldest but most outdated theory is the moral model.¹⁴ Although not supported by any scientific evidence, this theory characterizes the prevailing attitude of many Americans that drug abuse is a choice and represents a moral failure of those who choose drugs.¹⁵ Certainly, an initial choice is made to experiment with drugs, but, at some point, opioids change brain function.¹⁶ With repeated drug use, choice transforms to physical dependence and potentially addiction.¹⁷ The moral model is reflected in the “Just Say No” campaign started in 1982 by Nancy Reagan.¹⁸ Although that may be a helpful slogan for individuals who have not yet participated in illicit drug activity, it is not realistic for someone in the chronic phase of the disease.

The current prevailing theory is the biologic (disease) model, well supported by scientific evidence that has been mounting since 1997.^{15,16,19–21} The biologic model describes drug addiction as a disease acquired by individuals who have characteristics that cause them to experiment with drugs. It is thought that people who gravitate toward drug abuse are more sensitive to their pleasurable effects, and they experience a greater reward than most.²² At first, they find the pleasure that the drug brings hard to resist until they become physically dependent. Physical dependence is defined as the need to have the drug to avoid withdrawal symptoms and often the need for more drug to achieve the same effect (tolerance).²³ Those who do not become addicted find the effects of drugs less pleasant and tend to avoid them.²⁴ Although no single factor can predict if a person will become a drug addict, it is assumed that biology, environment, and development all play important roles.^{17,25,26} Drug addiction is also considered to be a preventable disease, with programs involving families, schools, communities, and media.²⁷ It is also possible (for some people) to use and even abuse drugs occasionally without significant impact on their health, employment, or relationships.^{27,28} Others may be “destined” for drug addiction after

a single use given the right combination of risk factors.²⁸ Drug abuse often leads to drug addiction, but not everyone who abuses drugs becomes an addict.^{27–29} People can also become physically dependent on a prescription opioid but not demonstrate addictive behaviors. Prescription drug abuse is, however, a very common risk factor for addiction.²⁸ People who develop an addiction tend to show a predisposition to drug abuse at an early age, sometimes identified as “acting out” or other behavioral problems.²⁸

RISK FACTORS FOR OPIOID ADDICTION

Risk factors fall into the three broad categories of biologic, psychosocial/developmental, and environmental.^{28,29} Most experts agree that more than one risk factor is necessary, and everyone has their own “mix” of factors that trigger an addiction.²⁸ Biologically based factors include genetics and genomics,^{30,31} neurologic, and biochemical. Examples include differences in the level of tolerance and the ability of the liver to metabolize and adapt to opioids,³² depression, or bipolar disorders.³³ A family history of addiction or mental illness^{34,35} or an increased sensitivity to the release of neurotransmitters in the amygdala³⁶ are also biologic risk factors.

There are many psychosocial and developmental stress factors, such as low self-esteem, unresolved grief or anger, peer pressure, conflicts with peers or parents,³⁷ and posttraumatic stress syndrome.³⁸ Adolescent risk is particularly high because the prefrontal cortex, which guides thoughtful decision making, does not fully develop until the mid-20s.³⁹ It is very important to note that the younger a person is when he or she experiments with drugs or alcohol, the more likely he or she will develop an addiction.⁴⁰ Tobacco, marijuana, and alcohol are considered “gateway” drugs in the adolescent.⁴⁰ Because the adolescent brain that governs judgment and decision making is not fully developed, it can be damaged permanently from early abuse.²⁰

The environmental risk factors include the availability of drugs, living with someone (a parent or significant other) who abuses drugs, abusive or neglectful parents, or feeling alienated and isolated.⁴¹ Alternatively, sometimes people live in the “American Dream” household surrounded by caring and supportive families, yet still succumb to addiction, perhaps influenced more heavily by internal risk factors. People who begin to abuse drugs tend to affiliate with other people who abuse drugs, perpetuating the behavior. An analogy to the effect of environment on the development of a chronic disease is a person who starts eating high-fat fast foods. At first, the only effect might be weight gain. Eventually, that person may develop hypercholesterolemia leading to hypertension, a chronic disease. Similarly, a child who is living in a home filled with smoke and pet dander is more likely to develop asthma than a child raised in a dust-free, smoke-free environment. Thus, using and abusing drugs, even for a short period of time, causes a brain pathophysiology that alters the way the addict’s brain functions.¹⁶ When that happens, the abuse

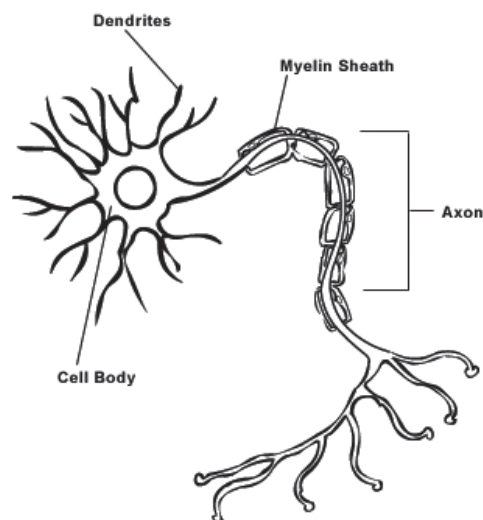
has developed into a chronic condition that must be treated as a lifelong problem.¹⁷ As mentioned earlier, brain development poses a risk for adolescents and young adults, so a brief review of brain neurophysiology will illustrate how and why this chronic illness develops.

THE ROLE OF BRAIN NEUROPHYSIOLOGY IN OPIOID ADDICTION

The brain contains millions of neurons, each of which consists of a cell body, dendrites, and one axon.⁴² The dendrites are short and receive chemical messages from other neurons to send to the cell body. The long-threaded axon sends messages from the cell body to the dendrites of other neurons (Figure 1). The space between the neurons is called a synapse.⁴² Neurotransmission is the process of sending messages from the axon of one neuron to the dendrites of another neuron through the synapse.⁴² When the message reaches the end of the axon, it causes release of neurotransmitters to help it move through the synapse to the dendrites (Figure 2). The job of the neurotransmitter is to unlock the receptors on the dendrites, so the message from the axon can be propagated.⁴² Dopamine is one of the neurotransmitters that enable transmission of brain messages, and a bath of dopamine in the brain significantly contributes to a good mood and feelings of pleasure.⁴³

Brain development occurs in a general sequence from the back to the front.³⁹ The prefrontal cortex does not reach maturity until the mid-20s, but it is responsible for decision making, managing emotions, controlling impulses, planning and reasoning, and delaying gratification.³⁹ It's the "stop and think" portion of the brain that considers the consequences of actions. The limbic system, which contains

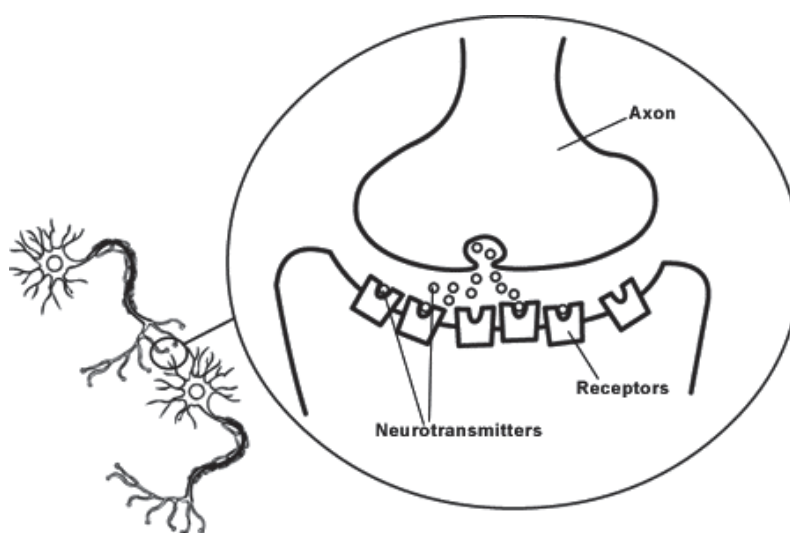
FIGURE 1 ■ Illustration of a neuron with dendrites and axon.



From National Institutes of Health, National Institute on Drug Abuse.

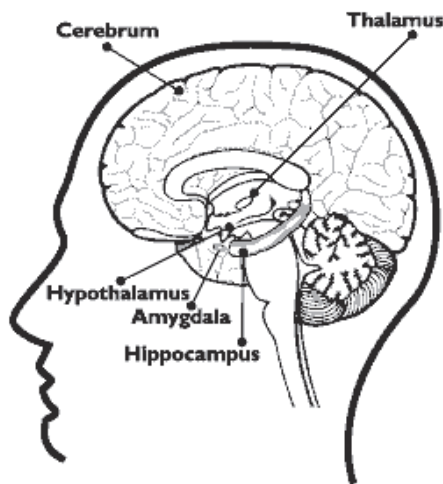
the amygdala and the hippocampus, is in the center of the brain, so it matures before the prefrontal cortex³⁹ (Figure 3). The amygdala is the "pleasure center" associated with emotions, whereas the hippocampus involves memory.³⁹ The limbic system is the "let's go!" part of the brain, normally tempered in the mature brain by the prefrontal cortex that considers consequences. This sequence of brain development helps to explain why some adolescents tend to take more risks than adults. They are ruled by the limbic system with inadequate input from their immature

FIGURE 2 ■ Illustration of neurotransmitters being released from the axon into the synapse to unlock the receptors in the dendrites of another neuron.



From National Institutes of Health, National Institute on Drug Abuse.

FIGURE 3 ■ The location of the limbic system deep in the brain.



From National Institutes of Health, National Institute of Drug Abuse.

prefrontal cortex. They are not yet wired to stop, think, and consider the consequences.

Pathophysiology: The Brain on Drugs

Research has demonstrated that opioids activate the limbic system in the brain in the same way as natural endorphins.⁴⁴ Opioids cause the brain to release natural chemical messengers such as dopamine, while blocking the natural reuptake and metabolism.⁴⁴ The synapses become flooded with dopamine and other neurotransmitters, which overstimulate the brain's pleasure center. When the brain is constantly overstimulated, it attempts to achieve homeostasis by adjusting the level of dopamine and other neurotransmitters by decreasing production or eliminating the receptors.⁴⁴ Without the flood of opioid-induced dopamine, the drug addict feels depressed and lifeless. Normal experiences that create pleasure become ineffective because the addict's brain has been rewired to reduce or eliminate dopamine. Addicts return to the drug to feel good despite the feeling being short lived. In addition, opioids cause changes in the brain's gray matter,⁴⁵ which are irreversible.

These physiologic responses make it easier to understand, then, why addicts are always drug seeking. It's the only source of feeling good that works anymore because they have become physically dependent. It's not a moral failure; it's a physiologic need. Without the narcotic, they are deeply depressed and feeling bad. All they can think about is how to feel good quick, and the answer is more narcotics. They become consumed with getting more, no matter the cost. The cost often includes neglect of others, including children once loved dearly, or not taking care of themselves. They may risk their lives to acquire more drugs, becoming involved

in prostitution or other illegal activities. These behaviors further compound the psychological factors, perpetuating a cycle of guilt, shame, and remorse that drives the addict to more drug use. It quickly devolves to a vicious feedback loop as the drug addict gets high to feel good, crashes, and then needs more drugs to feel good. After prolonged abuse, the "feel good" phase of this cycle disappears, called tolerance or "desensitization."⁴⁶ Addicts can spend all their time and money chasing a high that no longer exists. It is possible to become so tolerant that taking the drugs that once flooded the brain's pleasure center and caused massive amounts of euphoria now only manages to make addicts feel "normal" enough to make it through the day. They have lost control and require treatment to begin recovery from a disease that has taken over their lives.

DRUGS USED IN TREATMENT TO PREVENT RELAPSE IN PREGNANT WOMEN

As a chronic disease, opioid addiction must be treated in much the same way as other chronic diseases. Short-term, one-time interventions are rarely successful. Successful treatment often requires more than one exposure. Perhaps surprisingly, relapse rates for addiction are similar to those for other chronic diseases such as diabetes, hypertension, and asthma.⁴⁷ The National Institute of Drug Abuse (NIDA) defines 13 principles to guide effective addiction treatment, which are beyond the scope of this article. Also available is a "TIP" (Treatment Improvement Protocol) specifically addressing the needs of women.⁴⁸ Two common pharmacologic treatments and their use in treatment of pregnant women are described in the following text.

Methadone

Methadone has been used during pregnancy for women who seek treatment for opioid addiction since the 1970s and was approved by the Federal Drug Administration (FDA) for that use in 1985.⁴⁹ Pregnant women in methadone treatment programs tend to have more prenatal care, better weight gain, and better perinatal outcomes than those who continue to use illicit drugs.^{50,51} Methadone prevents the onset of withdrawal symptoms, eliminates drug craving, and blocks the euphoric effects of illicit self-administered narcotics. It also enables consistent maternal opioid levels to protect the fetus from repeated episodes of withdrawal and decreases the risk for HIV and hepatitis infection by reducing drug-seeking behaviors such as prostitution. When a woman chooses to enroll in a methadone treatment program, she is taking an important step toward recovery and making the best possible choice for herself and her baby.

Although methadone is not associated with major maternal adverse events, it predisposes a wide range (13–94 percent) of infants to be born with NAS.⁵² Cleary and colleagues also report significantly more preterm births, higher incidence of small for gestational age (SGA), more frequent admission to the NICU, and increased diagnosis of a major

congenital anomaly in infants exposed prenatally to methadone.⁵² Detoxification from methadone by decreasing the dose or cessation of the drug during pregnancy is also not recommended because that is associated with fetal death.^{50,53}

Buprenorphine

Buprenorphine has emerged as an alternative to methadone during pregnancy that has recently been investigated because it seems to have less detrimental effects on the fetus and the newborn.⁵⁴ Jones and colleagues studied the outcomes of infants of 175 mothers randomly assigned to methadone or buprenorphine.⁵⁵ Infants who were exposed prenatally to buprenorphine required significantly less oral morphine, had a significantly shorter length of stay in the NICU, and had a significantly shorter duration of treatment than those exposed to methadone. Women in this study, however, were more likely to discontinue treatment if randomized to the buprenorphine group. Other investigators have reported that NAS severity is lower in infants exposed to buprenorphine, they are quicker to recover,⁵⁶⁻⁵⁸ and they have better growth parameters.⁵⁹ Clinicians must weigh the risk of mothers discontinuing buprenorphine treatment against better neonatal outcomes when deciding on a course of treatment.

NURSING IMPLICATIONS

Neonatal nurses are well aware of the substance abuse epidemic that is affecting pregnant women and their infants everywhere. The Substance Abuse and Mental Health Services Administration (SAMHSA) reports that 5.0 percent of all pregnant women used illicit drugs in 2011.⁶⁰ The highest rates were among pregnant women aged 15-17 years (15.8 percent) and those aged 18-25 years (7.1 percent).⁶⁰ The number of pregnant women taking prescription opioids or other illicit substances is probably underreported because SAMHSA uses a self-reporting mechanism. Several researchers have reported higher rates of prevalence when mothers are routinely tested.⁶¹⁻⁶³ Universal testing, however, is not currently recommended by any professional organization. It is costly, requires maternal consent, and only reflects recent ingestion in the previous 48 hours.⁶⁴ Instead of testing, Wallman and colleagues recommend universal screening for all pregnant women with a series of frank questions during the prenatal visit.⁶⁴ This kind of screening—regardless of race, age, or income—singles no one out for any subjective characteristic. In a study of nearly 50,000 pregnant women, Goler and colleagues demonstrated that even a single conversation about substance abuse with a health care professional during prenatal care improves perinatal outcomes.⁶⁵ Similarly, French and colleagues undertook their study to improve interactions between mothers with a history of drug abuse and their infants because they correctly hypothesized that a simple nursing education intervention would be effective in improving parenting outcomes after discharge.⁴ Shanahan and colleagues successfully enrolled most

(59.0 percent) addicts in a drug treatment program during an unrelated hospitalization, which they attributed to routine screening for substance abuse.⁶⁶

The evidence that indicates perinatal outcomes can be improved with frank conversations may be extended to mothers of infants with NAS in the NICU. Motivational interviewing (MI) is an evidence-based technique used in the treatment of people with addiction disorders to help them strengthen their motivation and move toward a specific goal.⁶⁷ The basic approach to MI is using open-ended questions, affirmations, reflections, and summary (OARS) that help the client convince themselves that change is necessary. Very importantly, a nonjudgmental attitude is critical to develop a trusting relationship during this kind of exchange.

Many NICU and perinatal nurses have become engaged in educating women with substance abuse about what to expect after delivery, using evidence previously provided or recommended.^{4,6,10,11} Specialized prenatal classes are available in many communities that are designed to teach the mother about the symptoms of NAS, how it is treated, and the specialized handling techniques that create a supportive environment for the infant. A NICU tour is often included so the mothers can see where their infants might live for the first few weeks of life. Mothers can be referred to these specialized classes by their obstetrician or in collaboration with a community-based drug treatment program.

Gerace and colleagues describe a longitudinal training for nurses that significantly improved their knowledge, attitudes, and clinical confidence to manage their patients who have substance abuse problems.⁵ Their program had six days of content over three years and was provided to a volunteer group of 32 nurse participants. The content included the addiction process, pharmacology, withdrawal, physiology of addiction, treatment management, and more. A program such as this in the NICU can be expected to stimulate knowledge and perhaps attitudinal change in support of mothers of infants with NAS. Even more powerful, Corse and colleagues described the impact of their care model that a group of nurse midwives implemented to enhance their effectiveness in prevention and early intervention for women of childbearing age who abused illicit substances.³ Besides increasing their knowledge about addiction, the most important improvement they made was a difference in their interviewing style. Instead of asking, "You don't drink, do you?," they changed to a less judgmental question, "How many drinks do you tend to have in a week?" They found that information gathering, especially at the first appointment, was more important than focusing on education and the dangers of use during pregnancy. Listening to what the women had to say caused many of the midwives to be more conscious of how difficult it is to change addictive behaviors and that minor successes should be acknowledged. One midwife remarked about the impact of the care model on her practice: "I feel humbled. I really had a lot of misconceptions, ignorance, and denial about substance abusers. My admiration for people who are

dealing with it has grown. There have been more rewards than I expected.”³ Although the authors of this study describe an approach to pregnant women who are drug addicted, their results provide evidence that a similar model can and should be implemented in the NICU. The benefits may be unknown in that population, but the evidence suggests they might be dramatic.

Finally, because attitude of health care providers plays such a pivotal role^{3,5,6,10,11} and has been repeatedly implicated as a barrier to successful treatment,^{3,5,6,8} NICU nurses might consider engaging in self-reflection about their feeling toward drug addiction. Do they have negative stereotypes of addiction that encumber their relationships with mothers they encounter in the NICU? Do they have negative experiences with their own family members who have not been successful with recovery? Have they availed themselves of the scientific evidence surrounding drug addiction? Can they learn more so they can provide the compassionate care these mothers need?

Almost any drug that the mother ingests will impact the perinatal outcome. Those with the most serious effects include heroin, prescription narcotics, inhalants, and alcohol. Although the drug of choice might be different, the effect on the amygdala is the same. Repeated drug use causes a cascade of dopamine release that the brain attempts to control by eliminating endogenous sources.⁴⁴ Once those sources are gone, the potential for feeling good naturally does not exist. The physiologic need to feel good overtakes all other concerns in a vicious cycle. Drug addiction is not a moral failure, and it is not an ongoing choice. Treating addiction as a chronic disease instead of a moral deficiency will be more supportive to women who abuse drugs because it creates an atmosphere of objectivity rather than an attitude of rationalization and justification of defiance. Better understanding by nurses of the factors underlying drug addiction has the potential to improve nursing care for women addicted to opioids and outcomes for these women and their infants. Engaging mothers with specialized education about their infant at risk for NAS will also help improve outcomes of mothers and infants. Lack of accurate information about addiction is likely to perpetuate and reinforce counterproductive views of women with addictions.⁵

ACKNOWLEDGMENTS

Many thanks to Kristin Keating for sharing her personal insight.

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